FLOOD RISK ASSESSMENT
FOR RESIDENTIAL DEVELOPMENT AT
GEDNEY BROADGATE

FINAL REPORT

ECL0199/ SWANN EDWARDS ARCHITECTURE LTD

DATE FEBRUARY 2020

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1.0 INTRODUCTION

This Flood Risk Assessment has been prepared in accordance with National Planning Policy Framework (NPPF) and supporting planning practice guidance (PPG) on Flood Risk and Coastal Change.

In areas at risk of flooding or for sites of 1 hectare or more, developers are required to undertake a site-specific Flood Risk Assessment to accompany an application for planning permission. This Flood Risk Assessment has been produced on behalf of Mr & Mrs Doubleday-Collishaw in respect of a development that consists of one dwelling at Gedney Broadgate.

A planning application for the proposed development is to be submitted by Swann Edwards Architecture Ltd.

2.0 SITE LOCATION AND DESCRIPTION

2.1 Site Location

The site is located at Pulvertoft Hall Farm, Gedney Broadgate, Spalding, PE12 0DG. The National Grid Reference of the site is 54005/321694.

The location of the site is shown in Figure 1.



Figure 1 – Location Plan (© OpenStreetMap contributors)

2.2 Existing Site

The site is part of an agricultural holding on the western side of Bullocks Short Gate. The barn is of a corrugated construction and currently in use. The area of development is approximately 0.12 hectares.

Spot levels have been taken at the site and are shown in Attachment 1. The area around the barn is typically at a level of +2.75m OD and the barn has a finished floor level of +2.87m OD. The carriageway level of Bullocks Short Gate at the entrance to the site is +3.12m OD.

The site is in the South Holland Internal Drainage Board (IDB) District. The site and the surrounding land are within the Free Discharge catchment and drains to the South Holland Main Drain and discharges to the tidal River Nene at the Sutton Bridge Outfall Sluice.

The online British Geological Survey maps indicate that the site is likely to be underlain by Ampthill Clay Formation mudstone. The bedrock is shown to be overlain with superficial deposits of clay and silt.

2.3 Proposed Development

The proposed development consists of the conversion of the barn to form one new dwelling. The dwelling will be two storey and use the existing access.

2.4 Local Development Documents

The South East Lincolnshire Local Plan 2011 – 2036, adopted in March 2019, is the Local Plan for the district. Policy 4: Approach to Flood Risk states the requirements for flood risk reduction.

The South East Lincolnshire Level 1 and Level 2 Strategic Flood Risk Assessment (SFRA) was prepared in June 2017.

The Joint Lincolnshire Flood Risk and Drainage Management Strategy has been prepared by Lincolnshire County Council as the Lead Local Flood Authority. The purpose of the Strategy is to increase the safety of people across Lincolnshire by reducing the number of people at risk of flooding, increasing the resilience of local communities and reducing the impact of flooding

2.5 Flood Zones

The site is located within Flood Zone 3, an area with a high probability of flooding, of the Environment Agency Flood Maps for Planning as shown in Figure 2.



Figure 2 – Environment Agency Flood Map for Planning

The Environment Agency Long Term Flood Risk maps show that:

- the site has a low risk of flooding from rivers or the sea (annual probability between 0.1% and 1%);
- the site has a very low risk of surface water flooding (annual probability less than 0.1%); and
- the site is not within an area at risk of reservoir flooding.

Table 1 shows the level of risk at the site within the South East Lincolnshire SFRA.

SFRA Map	Present Day	2116
Residual Flood Hazard Map for the 1% fluvial and 0.5% tidal event	The site is outside the 'Low Hazard' area	The site is in the 'Low Hazard' area
Residual Peak Depth Map for the 1% fluvial and 0.5% tidal	The site is outside the area at risk	The peak flood depth is between 0.0m and 0.25m.

Table 1 – Flood Risk within SFRA Maps

3.0 FLOOD RISK VULNERABILITY

3.1 The Sequential and Exception Test

The NPPF requires the application of a Sequential Test to ensure that new development is in areas with the lowest probability of flooding.

The Exception Test is a method to demonstrate and help ensure that flood risk to people and property will be managed, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.

3.2 Vulnerability Classification

Table 2 of the PPG Flood Risk and Coastal Change categorises different types of uses and development according to their vulnerability to flood risk. The proposed development is covered by the description of buildings used for dwellings and is classified as 'More Vulnerable'.

Table 3 of the PPG Flood Risk and Coastal Change sets out Flood Risk Vulnerability and flood zone 'compatibility'. The site is in Flood Zone 3 and the development is 'More Vulnerable' therefore it is necessary to complete the Exception Test.

PPG Flood Risk and Coastal Change defines that the lifetime of the development in terms of flood risk and coastal change is 100 years.

3.3 Application of the Sequential and Exception Test

The Sequential Test and Exception Test are required to be applied by the Local Planning Authority.

Large parts of the South Holland district between the River Welland and River Nene lie within Flood Zone 3. As such, opportunities to undertake the development at an alternative site with a lower flood risk are limited. At this location it is not possible to position the development on higher ground within the proposed site.

The SFRA states that as it is necessary to use the refined flood risk information (hazard and depth maps) to assist with the application of the sequential test. The refined flood risk information contained within the SFRA demonstrates the site is not at risk during the present day 1% fluvial and 0.5% tidal event. The site therefore has a low probability of flooding and is considered to pass the Sequential Test.

The Exception Test requires consideration of the wider sustainability benefits of a development and that the development would be safe and residual risks managed.

The Local Plan has a target of a net increase of at least 11,681 dwellings in South Holland over the 25-year local plan period. The Plan considers this new housing is required to ensure the sustainability of the Local Plan area. The proposed

development will contribute to this target and the provision of rural housing is a benefit.

Section 5 of this Flood Risk Assessment describes the flood mitigation measures and the management of the residual risks, demonstrating that this development will be safe and not increase flood risk elsewhere. The development is considered to pass the Exception Test.

4.0 SITE SPECIFIC FLOOD RISK

4.1 Local Flood Assets

The site is 7.6 km west of the tidal River Nene. The site is protected by the River Nene tidal defences between Wisbech and Sutton Bridge. The River Nene is the responsibility of the Environment Agency.

There is a long-term strategy for the maintenance of the Environment Agency defences which is reviewed and updated every 5 years.

There is an extensive local drainage network managed by South Holland IDB. There is an IDB High Priority Watercourse on the eastern side of Bullock Short Gate. The site and the surrounding land are within the Free Discharge catchment and drain to the South Holland Main Drain and discharge to the tidal River Nene at the Sutton Bridge Outfall Sluice. The site is 2km north of the South Holland Main Drain.

During the operation and maintenance of its pumping stations, associated structures and channel systems, the IDB seeks to maintain a general standard capable of providing flood protection to its district. A routine maintenance programme is in place to ensure that the Boards assets are commensurate with the standard of protection that is sought.

Current maintenance standards of the South Holland Internal Drainage Board and the Environment Agency are generally good.

4.2 Sources of Flooding

The potential sources of flooding that have been identified during this assessment are:

- local blockages to the South Holland IDB drainage system;
- an event in the local drainage network greater that exceeds the standard of protection;
- failure of Sutton Bridge Outfall Sluice; and
- overtopping and/or breaching of the tidal River Nene.

4.3 Probability of Flooding

The probability of flooding associated with blockages in the South Holland IDB drainage system is low due to the maintenance standards achieved and managed by the IDB.

The standard of drainage provided by South Holland IDB is assessed at 2% annual probability (1 in 50 chance each year), compatible with the Department of the Environment, Food and Rural Affairs (DEFRA) target level of service for rural drainage and flood defence works. The risk associated with flooding due to events greater than 2% annual probability (1 in 50 chance each year) is lowered due to the South

Holland IDB high priority watercourses incorporating a freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).

The site benefits from defences on the River Nene that provide protection during a 0.5% annual probability (1 in 200 chance each year) tidal event and a 1% annual probability (1 in 100 chance each year) fluvial event.

4.4 Historic Flooding

During the preparation of this assessment, no evidence was discovered of the site being flooded.

4.5 Climate Change

Climate change is likely to impact the site through increased rainfall intensity and duration affecting the local drainage network and increased flood levels. The River Nene tidal defences have been designed to include an allowance for climate change. In summary the existing systems and defences are appropriate for the design life of the development (i.e. 100 years).

4.6 Residual Risk

There is a residual risk of flooding at the site should a breach occur. The South East Lincolnshire SFRA includes maps demonstrating the residual peak depth in 2116. When climate change allowances are applied to the 1% annual probability (1 in 100 chance each year) fluvial event and 0.5% annual probability (1 in 100 chance each year) tidal event the peak depth at the site from direct overtopping together with breach failure is up to 0.25m. An extract from this map is shown in Figure 3 below.

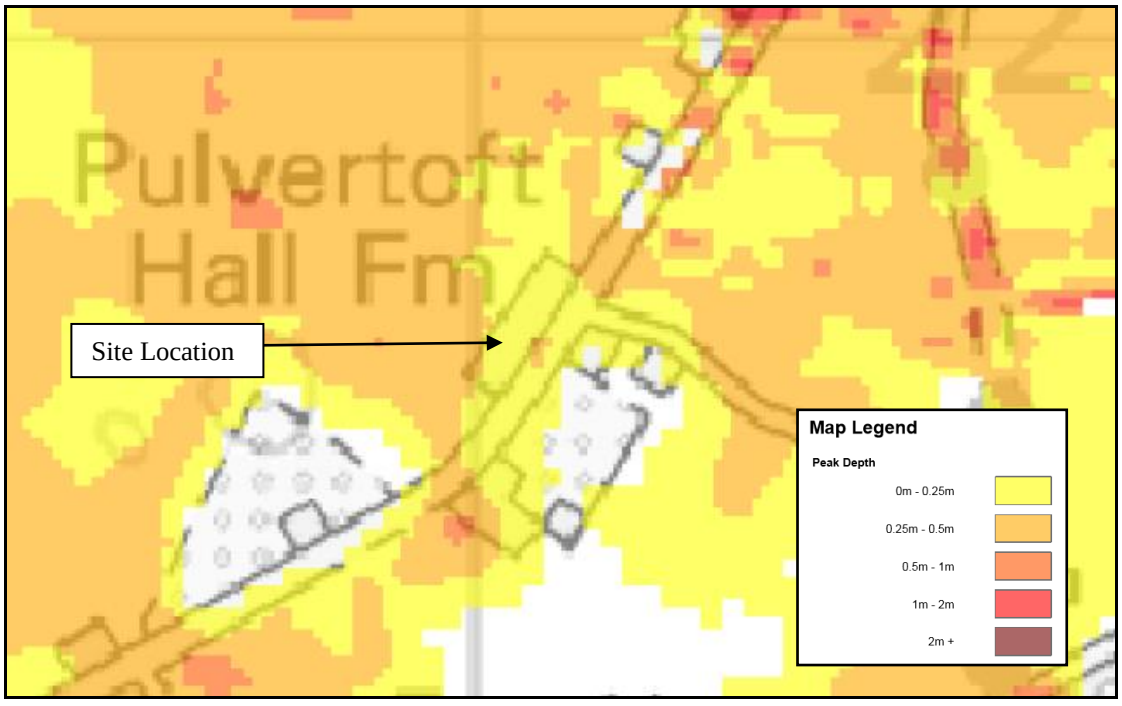


Figure 3 – SFRA 2116 Residual Peak Depth Map

5.0 FLOOD RISK MITIGATION

5.1 Summary of Risks

The probability of this development flooding from localised drainage systems is low. Failure of Sutton Bridge Outfall Sluice could lead to an increased level of risk at the site.

The probability of the site flooding from any Environment Agency system is less than 1% annual probability (1 in 100 chance each year) because of the standards of the existing flood defences. Over time there will be a gradual increase in risk to the site due to climate change. During the design life of the development it is not anticipated that the site would flood.

The SFRA considers the residual risk associated with overtopping and a breach in the defences in 2116. The maps show that the peak flood depth at the site is 0.25m. If during extreme events, levels of floodwater rose to such an extent that the site was affected, the situation would not be sudden.

Any increase in impermeable area associated with the development will be minimal so there is no potential that flood risk will be increased elsewhere due to surface water.

5.2 Mitigation Measures

The site has a low 'actual risk' of flooding. Based upon the information available during the preparation of this flood risk assessment, in order to mitigate against the remote risk of flooding it is recommended that the floor level of the dwelling is 0.3m above the surrounding ground levels. Furthermore, it is recommended that there is 0.3m of flood resilient construction above finished floor level.

The developer should ensure that the eventual occupier of the dwelling is sufficiently aware of the risk of flooding, and the standard of the existing defences. The Environment Agency provides a Flood Warning Service which includes Flood Warning Codes and uses direct warning methods where the risks and impacts of flooding are high.

In addition to direct and indirect flood warnings, the Environment Agency operates a 24 hour a day Floodline Service providing advice and information on flooding. The occupier of the dwelling should register with the Floodline Direct Warnings Service to receive any future flood warnings.

During an exceedance event it is anticipated that sufficient time would be available to take precautionary actions to limit the potential impact of flooding.

Should there be a failure of Sutton Bridge Outfall Sluice and conditions were such to put properties and land at risk of flooding, the Internal Drainage Board would take

emergency action to maintain the drainage level of service by utilising temporary pumping equipment.

It is recommended that surface water run-off is discharged to soakaways to BRE365 design requirements and therefore water from the site will not affect any adjoining properties or increase the flood risk elsewhere.

6.0 CONCLUSIONS AND RECOMMENDATIONS

As a result of the assessment, the following conclusions have been reached.

- The proposed development is in a defended floodplain. It is in the floodplain of the tidal River Nene and protected during the 1% annual probability (1 in 100 chance each year) fluvial event and 0.5% annual probability (1 in 200) tidal event including climate change.

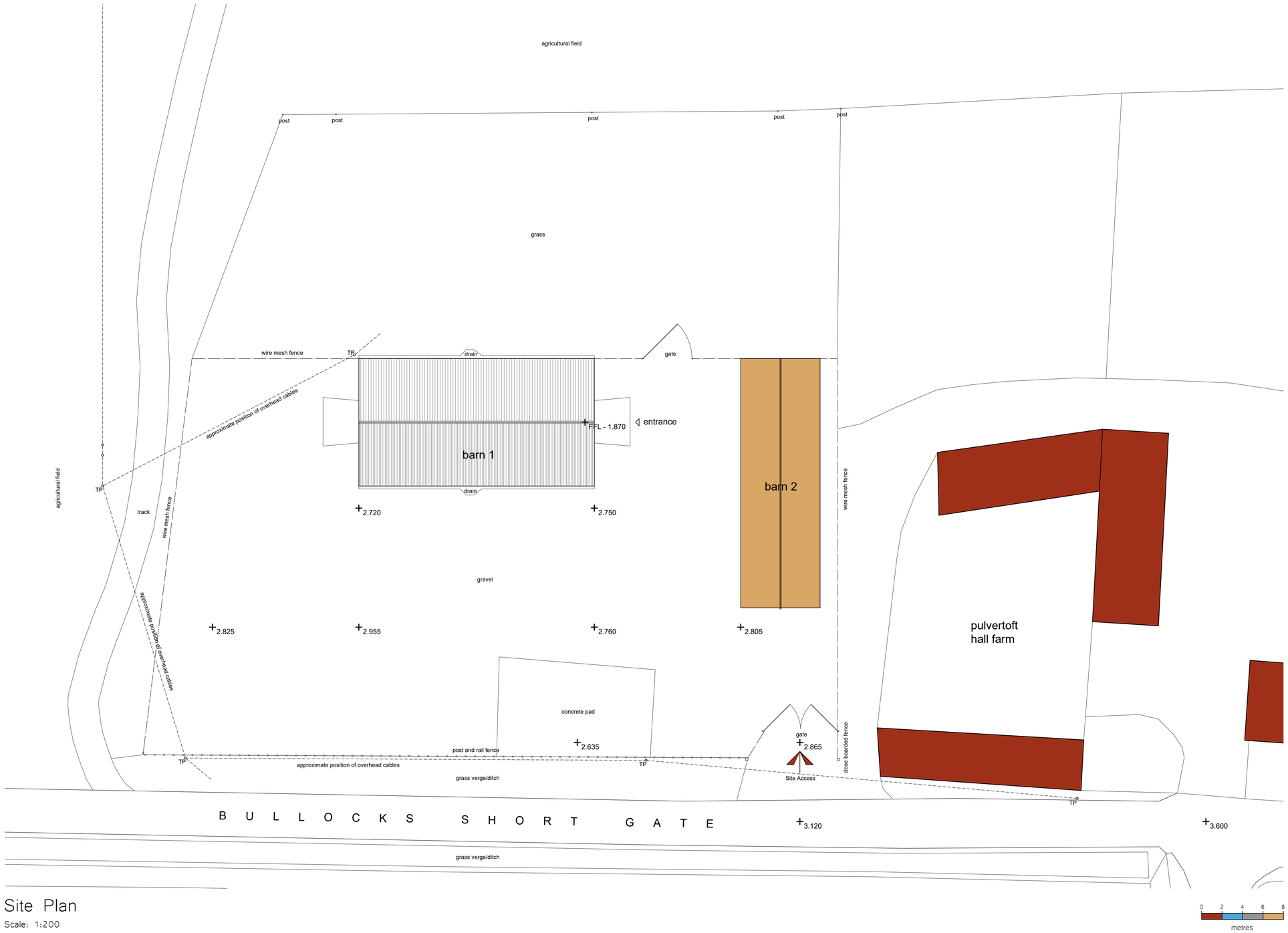
- The site is located within an Internal Drainage Board catchment with a minimum standard of drainage of 2% annual probability (1 in 50 chance each year) which accords with DEFRA guidelines for rural development. The risk of flooding is lowered further due to the South Holland IDB high priority watercourses incorporating a significant freeboard. This provides storage during events greater than 2% annual probability (1 in 50 chance each year).

- There is a residual risk to the site associated with a breach of the tidal defences. To mitigate this risk, it is recommended that the floor level is 0.3m above the surrounding ground levels and there is 0.3m of flood resilient construction above finished floor level. Surface water run-off from the development should be discharged to soakaways to BRE365 design requirements so that adjoining land and properties are not affected.

- The development passes the Sequential Test and Exception Test and is therefore suitable for the proposed location.

ATTACHMENT 1

SITE PLAN
(Dwg SE-1133 PP1000)



Site Plan

Scale: 1:200

General Notes

1. This drawing shall not be scaled, figured dimensions only to be used.
2. All dimensions are shown in 'mm' unless otherwise stated.
3. The contractor, sub-contractors and suppliers must verify all dimensions on site prior to the commencement of any work.
4. This drawing is to be read in conjunction with all relevant engineers and specialist sub-contractors drawings and specifications.
5. Any discrepancies are to be brought to the designers attention.

CONSTRUCTION DESIGN & MANAGEMENT REGULATIONS 2015

The following information must be read in conjunction with the project Risk register. This drawing highlights significant design related Health & Safety Risks present during Construction phase, and Residual Risks which remain post completion. Other Health & Safety Risks associated with Construction Activities may be present, and must be identified by the Principal Contractor prior to works commencing. Design Risks relating to specialist design items must be identified by the relevant specialist designers/ consultants ad issued to the Principal Designer.

SITE PLAN KEY

- Existing building surveyed for the purposes of the current application
- Other surveyed buildings on site
- Indicates un-surveyed buildings taken from OS map
- Site access (Site Access)
- Existing site levels to ordinance datum (+2.955)
- Existing features on site
- Existing gates (gate)
- Existing fencing

Status

FOR APPROVAL

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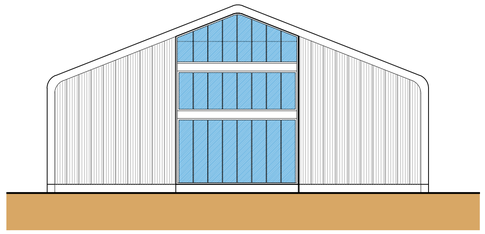
Job Title: Proposed Barn Conversion, Pulvertoft Hall Farm, Gedney Broadgate, Mr & Mrs Doubleday-Collishaw	Date: February 2020
	Drawn by: GG
	Checked by: RS
Drawing Title: Planning Drawing Site Plan	Job No.: SE-1133
	Sheet Size: A1
	Dwg No.: PP1000
	Revision:

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ATTACHMENT 2

FLOOR PLANS, SECTIONS, ELEVATIONS AND LOCATION PLAN

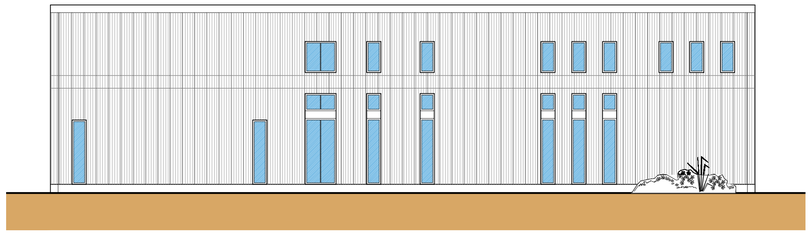
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Side Elevation (N)

Barn 1 - Scale: 1:100

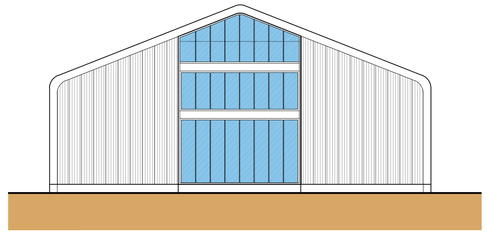
0 1 2 3 4 metres



Front Elevation (E)

Barn 1 - Scale: 1:100

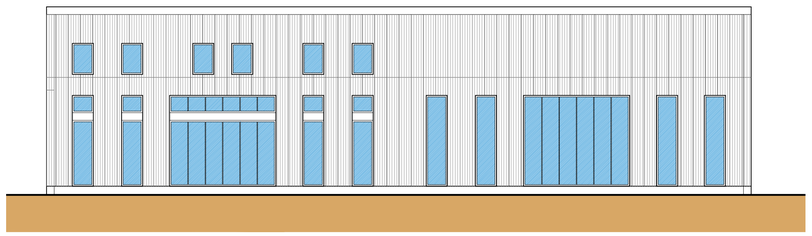
0 1 2 3 4 metres



Side Elevation (S)

Barn 1 - Scale: 1:100

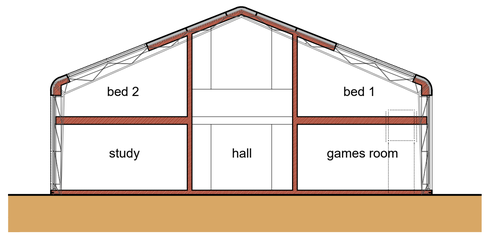
0 1 2 3 4 metres



Rear Elevation (W)

Barn 1 - Scale: 1:100

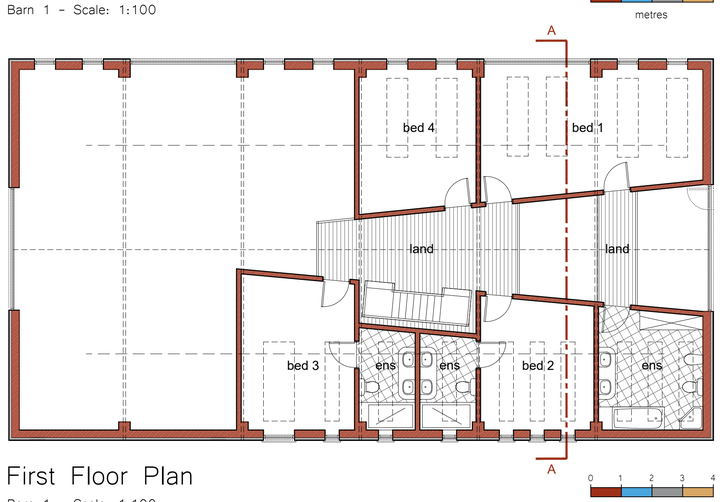
0 1 2 3 4 metres



Section A-A

Barn 1 - Scale: 1:100

0 1 2 3 4 metres



First Floor Plan

Barn 1 - Scale: 1:100

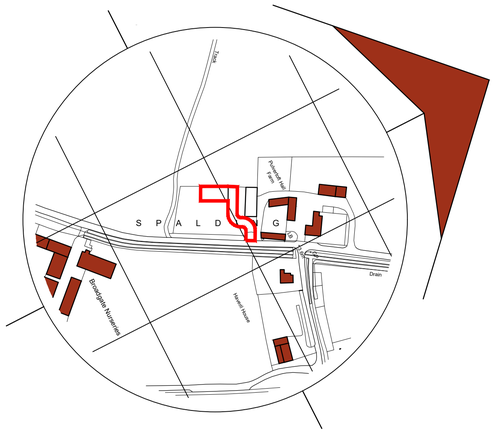
0 1 2 3 4 metres



Ground Floor Plan

Barn 1 - Scale: 1:100

0 1 2 3 4 metres



Location Plan

Scale: 1:2500

0 25 50 75 100 metres

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WALL KEY

- New walls
- Existing walls
- Existing structure
- Structures / features to be demolished

ELEVATION KEY

- Indicates corrugated cladding
- Indicates new windows and doors
- Indicates existing structure

Status

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Drawing Title: Planning Drawing, Barn1 - Floor Plans, Section A-A, Elevations, Location Plan	Job No.: SE-1133	Sheet Size: A1	
	Dwg No.: PP1001	Revision:	

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